ABSTRACT

A method of producing a semiconductor device wherein an already formed opening portion inner wall of an organic-based interlayer insulation film is prevented from changing in quality or corroding when performing etching on another organic material. The production method includes a step of depositing organic-based interlayer insulation films (4, 6), a step of forming an opening on the organic-based interlayer insulation films (4, 6), and a step of silylating a wall surface portion of the organic-based interlayer insulation films (4, 6) exposed in the opening portion for reforming (forming reformed layers (4a, 6a) by silylation). A more preferable production method further includes a step of forming protective layers (4b, 6b) including an inorganic-based insulation material on a surface of the silylated opening portion wall surface.

Explanation of References

1... FIRST INTERLAYER INSULATION FILM

2... LOWER LEVEL WIRING LAYER

3, 5... ETCHING STOPPER FILM

4... SECOND INTERLAYER INSULATION FILM

4a... SILYLATED LAYER, SILYLATED DIFFUSION LAYER OR MIXED LAYER

4b... SILICON OXIDE LAYER (PROTECTIVE LAYER)

6... THIRD INTERLAYER INSULATION FILM

6a... SILYLATED LAYER, SILYLATED DIFFUSION LAYER OR MIXED LAYER

6b... SILICON OXIDE LAYER (PROTECTIVE LAYER)

7, 7'... HARD MASK FILM

8, 8a, 8b... ORGANIC-BASED ANTI-REFLECTION FILM (ORGANIC FILM)

9... BARRIER METAL LAYER

10... COPPER

40... SECOND INTERLAYER INSULATION FILM

R... RESIST

VH... VIA HOLE